AVIATION

The Oldest American Aeronautical Magazine

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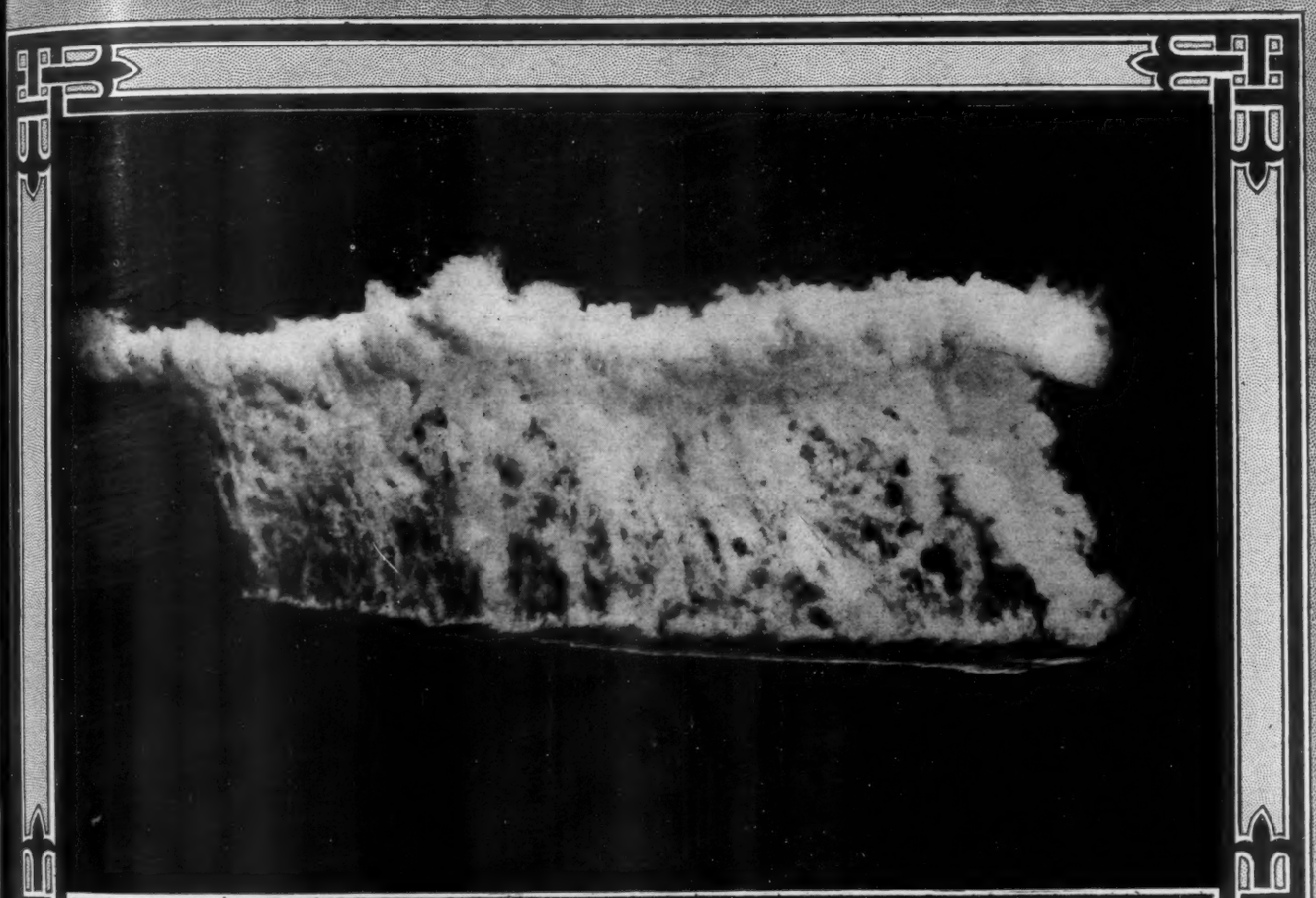

Puzzle Picture—Find the Anti-aircraft Guns on the Battleship!

VOLUME XV

NUMBER 20

SPECIAL FEATURES

AVIATION AND THE NAVY

GOODYEAR ACQUIRES ZEPPELIN PATENTS

REQUIREMENTS OF A MAN-POWERED AIRPLANE

NAVY FLIERS MAKE NEW WORLD'S SPEED RECORDS

THE GARDNER, MOFFAT CO., INC.
HIGHLAND, N. Y.
225 FOURTH AVENUE, NEW YORK

Entered as Second-Class Matter, Nov. 22, 1920, at the Post Office at Highland, N. Y. under Act of March 3, 1879.

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WRIGHT T MODELS ENGINES

NOVEMBER 12, 1923

AVIATION

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AVIATION

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Vol. XV NOVEMBER 12, 1923 No. 20

Aviation and the Navy

CAPTAIN LUKE McNAMEE, Director of Naval Intelligence, has attempted to correct elsewhere in this issue the "misunderstanding among the general public as to the attitude of the Navy towards aviation." He handles the acute subject of the battleship versus aircraft in a way that we believe will not be entirely convincing.

He states among other things that the defensive protection against air attack will be taken care of by "adding blisters or explosion chambers to the *older* ships' sides to protect the ships' vitals from bombs exploding nearby in the water. Additional steel decks will be added to *old* battleships to prevent penetration of the bombs that drop on board." This announcement is of great importance as it will bring up in the discussion of Naval appropriations the advisability of spending money to rebuild the older ships in the way he suggests. As to the practicability of the plan, it is highly improbable that Captain McNamee can convince the Congressman who has seen the bombing pictures of 1921 and 1923 that any old battleship could be protected from aircraft bombs by either blisters or any number of steel decks.

The most important part of his statement is his assertion that "in spite of an expenditure on aircraft of over one billion eight hundred million dollars since 1917, we have not today one-tenth of the aircraft we would need to enter war tomorrow. This is due to the short life of aircraft, the high cost of development and the frequency of crashes and operating casualties. Two-thirds of that cost would build a navy bigger than our present one—a navy that would be good for twenty years. So much for the economy argument." This is the first time, to our knowledge, that a responsible officer has definitely announced the total war cost of aviation to the Army and Navy. If this statement is accurate it would fix the cost of Naval Aviation at the absurd figure of about a billion dollars, as eight hundred million dollars would seem to be a very high figure to set as the cost of the Army Air Service during and since the war, using the figures given out by General Patrick. Captain McNamee will probably be asked to give the authority for his figure of one billion eight hundred million dollars.

This statement brings up the fairness of comparing the cost of wartime aviation—a new development—with the cost of a peacetime navy. The avowed purpose of this statement was to correct misunderstandings. Would it not have been more helpful to aviation at a time when the appropriations are being considered, to omit reference to the wartime expenditures and compare naval and aviation expenditures in time of peace. At present Naval aviation is allowed five per cent of the total naval appropriation.

Every fighting pilot in the Navy and Army will be surprised by Captain McNamee's concluding observation on the nature of fighting that the pilot engages in. He says, "The Navy is going ahead developing its aviation to the limit of its appropriations, but it hasn't forgotten that it isn't the man that hits and runs away that wins the fight." A reasonable interpretation of this view of the mission of fighting aircraft might be that the airplane pilot "hits and runs away." We cannot believe that the Director of Naval Intelligence implied any reflection on the bravery of our pilots who frequently fought to the death in the air, setting an example of seeking out the enemy in his own territory.

A Necessary Amendment

NOW that the International Aeronautical Federation has duly recognized the new world's records established with the assistance of a refueling plane by Capt. Lowell H. Smith and Lieut. John P. Richter of the Army Air Service, it seems timely and proper to raise the question of the desirability of recognizing further records made in this manner. To have done so before the F.A.I. passed on these records would have been unfair to the two pilots in question, for it might have impaired their chances of having their very remarkable and difficult performance given official recognition.

The whole question, to our way of looking at it, is this. The purpose of an airplane record is not so much to stimulate individual skill and prowess as to encourage technical development in the airplane. Now, while the successful and repeated demonstration of airplane refueling in flight is indeed a most important and valuable technical development, there remains the fact that the science of airplane design did not in the least profit by this particular record. The plane with which this record was made, to all intents a standard DH4, could tomorrow be flown for a week or two weeks, or in fact until the Liberty engine required overhauling, if in addition to fuel and food new crews would also be transferred from a convoying aircraft. And this appears quite feasible, though admittedly difficult.

That such a performance would vitiate the very purpose for which some airplane records are made, seems too obvious to require much elaboration. It would simply mean the stagnation of airplane design in one of the most important requisites of progress: load carrying efficiency, which after all means more efficient airfoils and aerodynamic combinations, and more reliable and economical aircraft engines.

It follows from the above that the F.A.I. rules governing records of maximum duration and maximum distance should include the reservation "without refueling." An amendment to this effect, submitted to the F.A.I. by the National Aeronautic Association, while highly desirable on technical grounds, would also wipe out the belief harbored in some foreign circles that we are living up to the letter rather than to the spirit of the F.A.I. rules.

The National Aeronautic Association has here a splendid opportunity for giving the international aviation world another proof of true American sportsmanship.

World's Maximum Airplane Speed Record Beaten

Navy-Curtiss Racer Piloted by Lieut. Alford J. Williams, U.S.N. Makes 266.6 mi./hr. over 3 km. Course

The world's straightaway speed record for airplanes, held by Lieut. Russell L. Maughan, A.S. with 236.58 mi./hr., was beaten four times in succession within three days by Lieuts. Alford J. Williams and Harold J. Brow, U.S.N. flying the Navy-Curtiss racers at Mitchel Field, Mineola, L. I. At the time of going to press the highest mark was attained by Lieutenant Williams on Nov. 4 with an average speed of 266.6 mi./hr., while Lieutenant Brow's best performance, made the same day, was 265.59 mi./hr.

The friendly contest between the two pilots which developed in the Pulitzer Trophy race, where Williams won and Brow finished second, was officially observed for the National Aeronautic Association by Maj. William N. Hensley, A.S., commandant of Mitchel Field. The speed trials were made over an electrically timed 3 km. course, each trial consisting of four flights in alternately opposite directions to compensate for any wind that might accelerate or retard the speed of the planes. The course extended from the southeast corner of Mitchel Field to the northwest corner of Curtiss Field, Garden City. Five hundred meters beyond each control observation posts were established to see that the pilots were in horizontal flight before reaching this "antechamber" of the speed course proper.

Under the rules of the International Aeronautic Federation contestants were required to fly not higher than 50 m., approximately 164 ft. By virtue of this the spectators were enabled to appreciate the amazing speed which the fliers were making over the course.

The Rain of Records

The first of these speed trials took place Nov. 2, when Lieutenant Brow covered the course at an average of 257.42 mi./hr. Then Williams went up and came back to find that he had made 258.61 mi./hr., beating Brow's mark by more than a mile. Major Hensley was just shaking hands with the winner, when Brow walked over to his ship and shouted for his mechanics to 'swing the prop.' He was off in a flash and raised the record another notch, making an average of 259.15 mi./hr.

This ended the day's performance. Williams was one of the first to congratulate him.

"Pretty good, Brow," he said, "but I'm going to beat it tomorrow."

No trials were made the following day on account of an unfavorable wind, but on Nov. 4 the friendly rivalry was resumed, bringing about amazing results.

At 2 p. m. Williams climbed into his plane. The motor roared. He was off. He covered the course twelve times, making six round trips. His best four consecutive trips were his fifth, sixth, seventh and eighth. They gave him an average of 263.3 mi./hr., and the honor of having defeated Brow and of having established a new world's speed record. He was jubilant. Brow congratulated him, and called his mechanicians to tune up No. 10.

Up went Brow. He flew the course just four times. On his last trip he covered the three kilometers in 24.4 seconds, or at a speed of 274.2 mi./hr. This was with the wind and was the best time made over the course. His average speed for the four trips was 265.69 mi./hr., which is what counted. He had beaten Williams by two miles an hour, and was the new speed champion of the world. But not for long, for now came a thrilling moment for the 2,000 persons who had gathered to watch the tests.

Lieutenant Williams already had doffed his sweater for a coat and was waiting to climb into a Vought plane which he was to fly to Van Cortlandt Park, where 20,000 of his fellow Bronxites were waiting to honor the winner of the Pulitzer Trophy.

"Congratulations, Hal," Williams exclaimed heartily as he clasped Brow's hand. "You beat me, all right, but I'll go up after you again to-morrow."

Then the big ex-pitcher turned and strode toward the waiting Vought. There he hesitated for an instant—and changed his mind.

"Get the old bus ready, boys," he said, turning to the crew of his ship with sudden decision. "I'm going up again."

The spectators were as excited as children when they heard the news. Here was the greatest speed contest in the world.

The world's fastest fliers congratulate each other—L. to R.: Lieut. Harold J. Brow and Lieut. Alford J. Williams

Williams climbed into his plane. A mechanic took hold of a propeller blade. Two others, holding hands, took his hand to pull him out of the way.

"Contact!" yelled the mechanician.

"Contact," replied Williams.

The three mechanics swayed in unison and pulled. The engine barked and spluttered and then settled down to a steady roar. Williams taxied out into the field, took to the air, circling and rising to about 9000 ft. to get elevation and a good starting distance behind the line. And then the gathering almost suffered heart failure.

The Crowd Gasps

Williams came down 9000 ft. in just about nothing, straightened out his plane not ten meters from the ground and roared over the course with vicious determination.

The crowd gasped. It looked as if the plane would not gain elevation before it reached a group of hangars. But it did. Williams said afterward it was the closest shave he ever had in his life.

He covered the course back and forth six times. Panel signals near the pylons told him how he was faring. A big strip of white canvas stretched on the ground like a minus sign informed him when he was falling behind. A plus sign told him when he was equaling his competitor. A double plus sign told him he had bettered him.

He had just whizzed over the field on his fifth trip at a speed of 266.4 mi./hr., when the spectators got their second jolt. A squadron of Martin bombers from Aberdeen, Md., appeared in the sky at maybe sixty miles an hour. There were five of them, come to take part in the air carnival for the Army Relief Fund. They knew nothing of the speed tests

and crept up over the field with ponderous grace to negotiate landings.

The Martin bombers were directly overhead, losing altitude all the time, when Williams came tearing through the air at a rate of 268 mi./hr. At that speed a pilot can't do much maneuvering, especially when he is after a world's record. Williams went right through the formation, never altering his course one inch. If chance had not timed the arrival of the bombers so that there was an opening for him—well, the rivalry would have stopped right there.

He came down and got the timers' report. He had averaged 266.6 mi./hr. in two round trips over the course, they told him, and had bettered Brow's performance by .91 of a mile. Now Williams was once more the world's speed record holder.

Brow shook his hand.

"Well, Harold," said Williams, "we're having lots of fun anyway."

"I'll beat you yet," replied Brow.

The following tables show the time and speed by Williams and Brow in the speed trials on Nov. 4.

Williams—First flight:

Attempts.	*Seconds per Leg.*	*Speed on Leg (mi./hr.)*
1	26.0	258.1
2	25.0	268.4
3	26.2	256.2
4	24.8	270.5

Average speed, 263.3 mi./hr.

Brow:

1	26.2	256.2
2	25.0	268.4
3	25.5	263.1
4	24.4	274.2

Average speed, 265.69 mi./hr.

Williams—Second flight:

1	25.5	263.1
2	25.0	268.4
3	25.2	266.4
4	25.0	268.4

Average speed 266.6 mi./hr.

Goodyear Co. Acquires Zeppelin Airship Patents

Goodyear to Organize Lighter-than-Air Manufacturing Company Granting Zeppelin Co. Minority Interest

An event of the greatest importance for the future of American airship development has just come to a head with the successful conclusion of negotiations between the Goodyear Tire & Rubber Co. of Akron, Ohio, and the Zeppelin Co. of Friedrichshafen, Germany, for the acquisition by the American firm of all the airship manufacturing rights of the German company.

The Goodyear company has made the following announcement with reference to this agreement:

Announcement by Goodyear Co.

"A new company, subsidiary to Goodyear, will shortly be organized for the purpose of manufacturing lighter-than-air ships and all requirements of that branch of aviation. The new company will be managed and controlled by Goodyear, and the Zeppelin interests will receive a minority interest in the company in exchange for their patent rights and the services of their technical staff. There has been no payment of cash by Goodyear to Zeppelin, and no cash consideration is involved in the acquisition of patent rights. The sole compensation to Zeppelin is a minority interest assuring them an equitable share in the results of the business.

"The Goodyear Tire & Rubber Co. has long been the leading producer in this country of lighter-than-air craft, and the principal source from which the Government has obtained its non-rigid and semi-rigid ships. The company is in fact today serving both the Army and the Navy in this capacity. With the advent of the rigid airship, and the results accomplished over the world with this type of vehicle, Goodyear resolved that its ability to maintain its position as leading producer of lighter-than-air craft would depend on its ability to successfully produce rigid ships. In the spirit also of keeping this country fully abreast with world-development in lighter-than-air rigids, Goodyear resolved to supplement its own technical staff with the best technical experience obtainable in the world. The Zeppelin Co., which is now building a reparation ship at Friedrichshafen for this Government, seemed unquestionably to offer an opportunity which could not be duplicated elsewhere. They had pioneered lighter-than-air development for over twenty years, and had studiously built up a volume of technical experience and a staff of experts superior to any other. Their achievements received world recognition just prior to and during the war, when many ships were turned out and operated with outstanding successes, including the commercial and safe transportation of many thousands of passengers.

"The Treaty of Versailles makes it impossible to continue either the construction or commercial exploitation of airships in Germany, and the negotiations just concluded by Goodyear make it possible to transfer to America all the benefits and experience attained by the Zeppelins during their long struggle in experiment and research.

"The practical successes of lighter-than-air aviation are more readily accepted in Europe because of its closer contact with the startling results already achieved. Confidence in this country is rapidly growing with the performance of the Shenandoah, and there is every reason to hope that America may now assume a leading and perhaps a dominant position in the introduction of rigid airships for both military and commercial uses. The arrangement just consummated assures to Goodyear exclusive rights in the United States and Canada, and therefore does not preclude formation of a similar industry elsewhere. The question as to whether we shall lead in this line therefore depends on the aggressiveness with which the American industry is launched and conducted.

"Goodyear management is confident that the day of aerial transportation is at hand and that rigid airships will soon demonstrate their practicability for long distance use on both land and sea, and with that confidence is now preparing itself to meet the country's requirements for that type of craft. A thoroughly balanced and experienced technical staff will be at work at Akron within sixty days, prepared to cooperate with the authorities at Washington and any other responsible interests who may desire to embark upon definite constructive projects. Goodyear intends to advance the cause of this new industry along sound, conservative lines, and it will be enlarged just as far and just as rapidly as responsible interest in this country will permit."

What the Deal Means

This statement confirms a rumor that has been circulating for some time that the Zeppelin rights have been purchased by a big American firm, and that giant air liners would soon be manufactured in this country.

It is understood that, when these negotiations are completed, a corps of experienced Zeppelin designers and builders will be brought to Akron from the Zeppelin works at Friedrichshafen, on the shores of Lake Constance, Germany, where Count Ferdinand von Zeppelin built his first floating sheds and made his first successful experiments in the construction of rigid airships twenty-three years ago.

From 1900 to 1919 the Zeppelin Co. built altogether 115 airships, of which three were experimental, nine commercial, and the rest military. It is a noteworthy fact that not a single passenger lost his life on a commercial Zeppelin airship.

When the Armistice was signed, ending the World War,

the Zeppelin construction and operating companies in Germany employed 1,600 executives and engineers and 12,000 workmen.

The Zeppelin plants in Germany have virtually closed since the war ended. Under the terms of the Treaty of Versailles, the manufacture of German aircraft which might be converted into instruments of war, is forbidden. For this reason, the plans of German aeronautical engineers to establish a two-and-a-half-day passenger trans-Atlantic service have not been carried out.

With Goodyear's acquisition of the Zeppelin patents and the employment of the Zeppelin engineers who have worked out the plans for a high speed trans-Atlantic service, it is pointed out, it remains for American capital and enterprise to make this world-dream a reality.

Organization of an airship navigation company is foreseen when the manufacture of the great air liners gets under way in Akron.

It is known, also, that careful surveys have been made by the Zeppelin engineers for the establishment of a twelve-hour New York-to-Chicago air service.

Twenty-five Years of Experience

As the result of twenty-five years of experience, the German engineers have evolved five typs of Zeppelins which may be regarded as standard, capable of carrying great loads of freight, all the fuel necessary for long distance flights, complete crews and from thirty to 100 passengers at the rate of from 60 to 90 mi./hr.

Plans also have been perfected for airships for scouting, long distance patrol work, mine spotting and short distance patrol, in war times.

The performance of these well-developed types has progressed so far that the German makers have been able to guarantee it.

It is understood that the Goodyear deal includes the patents and the right of manufacture on all the engines, the manufacturing machinery and the auxiliaries that have made the Zeppelins the finest airships in the world.

Goodyear officials have made many trips to Germany this year in order to negotiate for the patents.

William Young, Goodyear aeronautical chief, went to Germany several months ago. He announced at the time that an effort probably would be made to obtain the Zeppelin patents.

It is understood that the deal was clinched when P. W. Litchfield, vice president and factory manager of Goodyear, spent the last two weeks of September in Germany.

The Goodyear company, which has manufactured most of the airships that have been supplied to the United States Army and Navy, and which now has under construction several medium-sized non-rigids, was encouraged to enter the Zeppelin field by the performance of the ZR1, now known as the Shenandoah, built along Zeppelin lines.

French Seaplane Competition

The French Ministry of Marine in conjunction with the Under-Secretary of State for Air recently organized a competition, the object of which was to develop the type of flying boat suitable for high-seas work, a type that has so far been neglected in France.

For this competition the following entries were received: 1, Soc. Bellanger Frères (type Marine 42) (two 260 hp. Hispano-Suiza), pilot, Duhamel; 2, Louis Schreck (FBA) (140 hp. Hispano-Suiza), Laporte; 3, CAMS type 33B (two 260 hp. Hispano-Suiza), Hurel; 4, Soc. Bellanger Frères (type 42) (two 260 hp. Hispano-Suiza), Kerambrun; 5, CAMS type 33T. (two 260 hp. Hispano-Suiza), Rousset; 6, Blanchard and Cie. (two 260 hp. Hispano-Suiza), Maréchallat; 7, Soc. l'Aeronavale (type LeO13) (two 140 hp. Hispano-Suiza), Pommereau and Radisson; 8, Louis Schreck (FBA 17 HE2) (140 hp. Hispano-Suiza), Maïcon; 9, Bleriot Aeronautique (Bleriot-Blanchard) (four 180 hp. Hispano-Suiza), Duneau and Corong; 10, Soc. l'Aéronavale (type LeO13) (two 140 hp. Hispano-Suiza).

On Aug. 26-31 at St. Raphael, navigation tests, mooring-out tests, etc., took place. From Sept. 1-5 all machines had to make a double crossing of the Mediterranean leaving St. Raphael on the 1st, landing at Ajaccio, arriving at Bizerta on the 2nd and making the return journey on the 4th-5th to l'Etang de Berre a total distance of 1,622.7 km. (Approx. 1000 mi.) From Sept. 7-15 various tests had to be made to satisfy the demands of the French Ministry of Marine.

The prize list was a particularly heavy one. For the crossing of the Mediterranean the first prize amounted to 100,000 francs together with a Sèvres vase presented by the President of the Republic. The second and third prizes were 30,000 and 10,000 francs respectively. For the machine that fulfilled the requirements of the Ministry of Marine and gained highest marks, an order valued at 1,500,000 francs would be placed with the constructing firm for machines of that type, this sum not including the cost of the engines. In addition various monetary prizes were awarded for the pilots and mechanic-crews of the machines.

In the "Course Croisière" owing to unfavorable weather and various minor mishaps only three machines, Radisson's LeO13, Laporte's FBA and Hurel's CAMS 33B survived the outward crossing to Bizerta. Of these three machines Radisson's LeO13 retired at Antibes on the return journey, leaving two machines to complete the course. Laporte on the FBA 17HE2 arrived at the Etang de Berre 4 min. before Hurel and therefore won the "Course Croisière" with 122 points, the CAMS 33B scoring 83.

The weather after the first stage from St. Raphael to Cagliari became very heavy. The wind and sea got up and the clouds became so low that the pilots were compelled to fly low down.

The competition proved to be a sweeping victory for the FBA school flying-boat, which was purely an ordinary production job and was not specially built for this competition.

The failure of the second FBA was caused by Maïcon's mechanic falling a victim to a serious bout of air-sickness caused by the heavy weather. Maïcon had to retire finally from "mechanic failure," the regulations providing that the crews may not be changed.

The specification of the FBA 17HE2 is as follows:—Span: 12.87 m. Length: 8.94 m. Surface: 36.5 sq. m. Weight, loaded: 1,210 kg. Useful load: 350 kg. Weight per sq. m. 33 kg. Weight per hp.: 6.7 kg. Speed: 165 km./hr. Climb to 4,000 m.: 32 min. Take-off in 10 sec. Engine: 180 hp. Hispano-Suiza.

Diaphragms for Aeronautic Instruments

N.A.C.A. Report No. 165

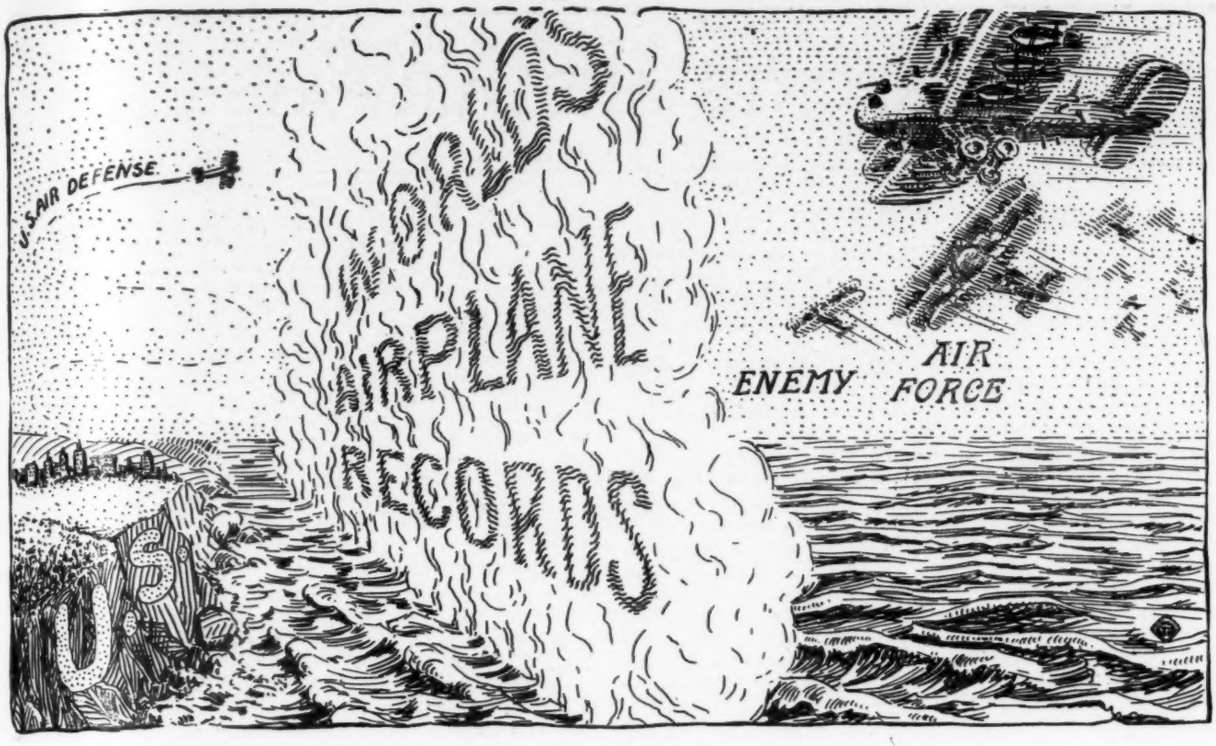
Report No. 165 of the National Advisory Committee for Aeronautics, by Mayo D. Hersey, comprises an outline of historical developments and theoretical principles, together with a discussion of expedients for making the most effective use of existing diaphragms, and a summary of experimental research problems.

Flexible diaphragms actuated by hydrostatic pressure form an essential element of a great variety of instruments for aeronautic and other technical purposes. The various physical data needed as a foundation for rational methods of diaphragm design have not, however, been available hitherto except in the most fragmentary form.

A copy of Report No. 165 may be obtained upon request from the National Advisory Committee for Aeronautics, Washington, D. C.

Beaumont Cup Race Postponed

The international airplane race for the Commodore Beaumont Cup, which was to have taken place Oct. 14 at Istres, France, has been postponed to next June. The reasons for the postponement were, in the first place, that no foreign entry was received; in the second, that the Nieuport entry was withdrawn when the company learned that there would be no foreign contestants; and lastly, the other two French entries, the Gourdou-Lesseurre and the Salmson-Bécherau, were likewise withdrawn when these firms learned of the Nieuport withdrawal.



Specially drawn for AVIATION by G. W. Edwards

We may fool ourselves, but not an enemy with this smoke screen

Wright Aeronautical Engines

The splendid showing made by the Wright Model T3 700 hp. engines in the Pulitzer Trophy race, at St. Louis, makes it timely to give a brief recapitulation of the principal characteristics of the various aeronautical engines now produced by Wright Aeronautical Corp. of Patterson, N. J. In this connection it is perhaps well to point out that the Wright 700 hp. engine is beyond question the only power plant of its size that has successfully withstood the gruelling test of a high speed contest like the Pulitzer Trophy race, where the two ships powered with this engine covered the distance of 200 km. (124 mi.) at an average speed of 230 mi./hr.

Model T3 Engine—This is a twelve cylinder, 60 deg. Vee, water-cooled engine. It has a bore of 5.75 in. and a stroke of 6.25 in., giving a displacement of 1947 cu. in. Depending on the compression ratio, this engine has two ratings, 525 hp. at 1800 r.p.m. and 650 hp. at 2000 r.p.m. The average powers developed at these speeds are 575 hp. and 680 hp. respectively. The weight of the engine, dry, is 1150 lb., giving a weight ratio for its higher power of 1.69 lb./hp.

The engine is a development of the Wright Model T2 engine, which has been in production for a year. The Navy's F2W ships raced at St. Louis were equipped with T3 engines. It was primarily designed for bombing and torpedo plane services, but owing to its light weight, as well as durability, it is applicable to single and two-place fighters, as well as observation planes.

Model H3 Engine—This is an eight cylinder, water-cooled, 90 deg. Vee engine, with a bore of 5.51 in. and a stroke of 5.91 in. The displacement is 1125 cu. in. The rated power is 390 hp. at 2100 r.p.m., with an average power of 400 hp. at 2100 r.p.m. The weight is 615 lb. This engine is a development of the original Model H engine and is built for pursuit work only, having a weight ratio of 1.54 lb./hp.

Model E4 Engine—This is a water-cooled, eight cylinder, 90 deg. Vee type of engine, with cylinders 4.72 in. bore and 5.11 in. stroke, with a displacement of 718 cu. in. The rated power is 190 hp. at 1800 r.p.m. The average power is 215 hp. at 1800 r.p.m. The weight, dry, is 480 lb.

This engine is a development covering eight years work in this country of the original Model A Hispano-Suiza engine. The engine has been so completely changed, that it is only similar to the original in displacement and crankshaft, practically everything else in the engine having been redesigned. One of these engines successfully passed the Navy's 300 hr. duration test, and it is the first and only engine to do so.

This engine was primarily designed for a training plane engine, but owing to its good weight per horsepower it makes an excellent single-seater fighter or alert ship engine, as well as an excellent commercial power plant, owing to its durability. For special purposes, it is posible to obtain 275 hp. from this engine.

Model J3 Engine—This is a nine cylinder, air-cooled, fixed radial engine, of approximately 44 in. diameter. It has a bore of 4.5 in. and a stroke of 5.5 in., with a displacement of 785 cu. in. The rated power of this engine is 200 hp. at 1800 r.p.m. The average power is 220 hp. The weight is 460 lb. This engine is a development of the Lawrance J1, having a stronger crankshaft, larger propeller hub and a single double carburetor induction system instead of three separate carburetors, together with an entirely new lubricating system. An effort has been made to overcome all the small service difficulties that have been experienced with the J1 engines.

This engine was primarily designed for a training plane engine, but is also particularly adapted to single seater fighters, as well as two-seater observation machines.

New Zealand Air Force

The New Zealand government has announced its intention to purchase the land and equipment now owned by the Canterbury Aviation Co., at Sockburn, Christchurch, South Island. The airdrome is to be used for training aviators and mechanics for the national defense.

This is the nucleus of a definite policy formulated by the New Zealand government, to provide the Dominion with a permanent air force, and it has also been stated that a base may be later established in Auckland for seaplanes as well as airplanes. The present owners formed their company in 1916, and to date have trained 186 pilots.

AIRPORTS AND AIRWAYS

Sperry Completes 2000 Mile Trip

Lawrence B. Sperry, president of the Lawrence Sperry Aircraft Corporation, landed on his flying field at Farmingdale, L. I., Oct. 19, accompanied by Mrs. Sperry, having completed and combined business and pleasure trip by air totalling well over 2000 mi.

Mr. Sperry is known to aviation as the "flying aircraft manufacturer." He designs a plane, builds it in his plant, and then flies it for demonstration to the Army and Navy Air Services.

Leaving Farmingdale at 5:10 a. m. about a month ago, Mr. Sperry flew to Washington, to keep an appointment with the Chief of Air Service. He completed his business at the capital at noon, and, after lunch, took off for the West as a competitor in the On-to-St. Louis Race held in connection with the air meet at St. Louis. He had dinner at McCook Field, Ohio, and then flew on by moonlight to St. Louis, where he arrived shortly after midnight. From St. Louis Mr. Sperry made flights to other mid-western towns. Upon his return to his plant, Mr. Sperry figured up that, on his 2000 mile trip he had used only 82 gal. of gasoline, which means a cost for fuel in travel by air of only 0.0123 cents a mile.

Through the Aeronautical Chamber of Commerce, of which he is a governor, Mr. Sperry told of receiving, while in Detroit, an invitation to visit Henry Ford at the latter's estate at Dearborn. Mr. Ford showed very keen interest in Mr. Sperry's "Messenger" plane and offered some good advice as to production and marketing in quantity. "Push the sale of the small plane with the city boys first," was Mr. Ford's idea, as he felt that the city chap was quicker to accept a new idea than the man on the farm. At least this was true when it came to running a tractor instead of driving a plough horse.

The Wright 60 hp. three-cylinder air-cooled motor with which Sperry's "Messenger" is equipped, seemed to interest Mr. Ford very much. He viewed it always from the standpoint of quantity production. If Mr. Ford's conviction that, in very large numbers, this engine could be built for $50 is true, Mr. Sperry said, lower-powered airplanes could be put on the market at well under $1,000. Mr. Ford expressed admiration for the design and construction of the engine, but remarked that he believed sand-blasting the cooling fins, instead of machining them, would greatly facilitate quantity building and also reduce the cost. The rocker arms, he thought, could be eliminated and the L-type head substituted. The latter, while not as efficient, he knew to be cheaper.

According to Mr. Sperry, Mr. Ford was impressed with the simplicity of up-keep in an airplane, as contrasted with an automobile. That there were no transmission, clutch, universals, drive shaft and rear end gears, appealed strongly to the Detroit manufacturer.

St. Joseph Mo., Air Meet

A very successful air meet, sanctioned by the National Aeronautic Association, was held Oct. 26-28, at Rosecrans Field, St. Joseph, Mo.

The three-day program, although marred by unfavorable weather which, in turn, affected the attendance, was complete in every particular. Some thirty planes were entered, including Army ships from Fort Riley and Kansas City, commercial planes from four states and three local planes, those belonging to Dr. Emmett Cook, George Wells and E. B. Tracey.

The main events of the meet were two airplane races around a 10 mi. certified course. The first race was over a distance of 100 mi. and was limited to planes with a maximum horsepower of ninety. This event was won by Perry Hutton on a Laird "Swallow" with an average speed of 94.48 mi./hr. — which is a remarkably fine performance and undoubtedly a "record", even though no such category of aircraft as "90 hp. planes" are officially recognized. Second prize was won by Wayne Neville, also on a "Swallow".

The second race, for 110 mi. distance, was open to planes having a maximum of 150 hp. This event was won by E. L. Sloniger on a Fokker powered with 150 hp. Hispano-Suiza engine, who finished first at an average speed of 117.7 mi./hr.

To prove the safety of modern flying, each day saw the dead stick landing contest. The aerobatic stunts, bombing contests, aerial golf game, parachute jumping from a height of 5,000 ft. and the marriage ceremony of Miss Nellie May Leffler and Mr. Richard Williams, performed by the Rev. O. P. Bishop while the three were up in a plane contributed much to the entertainment and aeronautical education of the spectators.

Philadelphia News

An impetus to flying in general, and to the organization of an airport in Philadelphia in particular, has been given by the recent announcement of the start of the recruiting of the first national guard flying group in Pennsylvania.

The announcement was made Nov. 1, by Maj. Gen. William G. Price, commander of the Pennsylvania National Guard who was authorized by the Secretary of the War to form such a squadron. The new unit will be a part of the 28th, or "Iron Division", which is composed of 12,000 citizen soldiers.

The squadron will have 33 commissioned officers and 190 enlisted men. It is hoped to have men for officers who are officially credited with bringing down German aircraft during the World War. Philadelphia was selected because of its large technical population and the fact that one complete squadron in the American Expeditionary Force was organized from among the citizens of Philadelphia.

The announcement of the formation of a flying squadron has been enthusiastically received by members of the Pennsylvania Aeronautic Association, for it is regarded as the forerunner of a wide spread interest in aviation in the Quaker City. It is hoped by former war aviators that this will lead to the creation of an airport which will place Philadelphia on a par with New York, Boston, Baltimore and other cities on the Atlantic seaboard. Heretofore Philadelphia has had little recognition in the aviation world, and was not even on the air mail route.

However, physically the city is ideally situated for establishing a first class airport, as there are any number of fields within twenty minutes ride of the center of the city. In addition the Delaware and Schuykill Rivers on either side of the city furnish an ideal place for seaplanes.—P. J. O'B.

Change in Air Mail Schedule

The Air Mail Schedule on the New York to San Francisco route, issued May 15, 1923 has been changed as follows:

Westbound—Leave New York 7:45 a. m.; arrive Bellefonte 10:20 a. m.; leave Bellefonte 10:40 a. m.; arrive Cleveland by 1:00 p. m.

Leave Chicago 7:00 a. m.; arrive Iowa City 9:10 a. m.; leave Iowa City 9:30 a. m.; arrive Omaha by 12:15 p. m.

Leave Rock Springs 7:15 a. m.; arrive Salt Lake City by 8:50 a. m. (MT).

Eastbound—Leave Reno 7:00 a. m. (WT); arrive Elko 9:30 a. m.; leave Elko 9:45 a. m.; arrive Salt Lake by 12 noon.

Leave Cheyenne 7:15 a. m. (MT); Arrive North Platte 9:15 a. m.; Leave North Platte 10:40 (CT) a. m.; arrive Omaha by 1:00 p. m.

Leave Chicago 11:00 a. m. (CT); arrive Bryan 1:00 p. m.; leave Bryan 1:20 p. m.; arrive Cleveland by 4:10 p. m. (ET).

Leave Cleveland 7:45 a. m. (ET); arrive Bellefonte 10:00 a. m.; leave Bellefonte 10:20 a. m.; arrive New York by 12:50 p. m.

St. Louis News

Bad weather and wet grounds have kept the flying at Lambert-St. Louis Field to a minimum in the past two weeks. Several students, enthused by the Air Meet, have appeared and have gone aloft with William B. Robertson of the Robertson Aircraft Corp.

The 110th Observation Squadron has continued its weekly drill. While ships are not yet available, Major Robertson has loaned the squadron an old Jenny for rigging training, and the ship will be brought to the armory this week for practise. A permanent organization has been worked out, and the men are being trained in their separate tasks.

The annual Air Circus of Scott Field, for the benefit of widows and orphans of Air Service men, was blessed with good weather on Sunday, Oct. 28. Fifteen thousand people paid a total of $9000 to the treasury of the fund. The burning of a Caquot observation balloon shortly after dark was the most spectacular of the many events. The flaming wreck was also illuminated by the rays of the searchlight. Five Messenger planes also performed stunts for the crowd. Jenny potato races, hand-driven airships, jumping balloon races and the common stunts of the airships completed the program. Because of a low ceiling, the Barling Bomber was unable to appear, and the projected sky-writing by Lieutenant Brookley was also abandoned.

A Vought observation plane, private ship of Maj. M. F. Scanlon was washed out when it fell into a spin at 150 ft. Lieut. James D. Givens, who was piloting it, was unhurt. The crash occurred about 100 ft. from the line of spectators, most of whom thought it was part of the program.

The Marine planes piloted by Lieuts. Ford O. Rodgers and H. D. Palmer from San Domingo arrived during the day on their 11,000 mi. flight. They announced that they had not even cleaned a spark plug since their departure from the islands. They have completed 8000 mi. of their journey.

Rear Admiral Moffat, chief of the Naval Bureau of Aeronautics, passing through the city last week, told officials that he would be greatly in favor of holding the 1924 International Air Meet in St. Louis. He characterized the flying field as ideal for the purpose and declared the arrangements here were the best he had ever seen.

While the civilians are not overjoyed at the care taken of them during the recent air meet, they are probably aware of the fact that the Army had charge of the field, and that the rules were not all of the Air Board's making. Next year particular care will be taken to reserve a good part of the field for them, and they will be given privileges and care greatly superior to any yet shown. Two new hangars are being built by the 110th National Guard Squadron, which will give additional storage for planes.

By next year, the field will be in perfect shape. Financially, the meet this year was an even break, and the corporation expects to keep it in condition through revenues from civilian fliers. The Flying Club of St. Louis is planning to erect a club house and to make arrangements with hotels in St. Louis to care for visiting aviators at a special rate.—M. H.

Kansas City, Mo., News

With the return of the local pilots from the races at St. Louis regular routine has again settled down upon the personnel and field. The Air Service Reserve Corps has now some added equipment, brought back by Lieut. J. B. Carroll from Dayton, and is out after a bigger local reserve corps and more action.

A number of commercial ships have been passing through on their way to distant points. The aerial delegation from St. Joseph, Mo. boosting their races and for the air mail to link St. Louis, Kansas City, and St. Joseph was through last week.

A number of improvements are planned at the field to be made with the money raised from the air meet held here several weeks ago as from a money raising meet it was very successful.

There has been quite a little cross country work to different points.

The Reserve Officers have turned the old Army Headquarters Building into a combined headquarters and club room with the addition of a stone and brick fire place of good size, and undoubtedly there will be many indoor flights from this point when bad weather sets in.

On Oct. 30, 1923 in the afternoon an inspection was made at the field of the equipment and facilities of both the Commercial and Army Air Services by General Joseph Haller, Commander and Chief of the Polish Armies. The General is on his return trip from attending the American Legion convention at San Francisco and stopped off at the field and to make several talks before civic bodies of Kansas-City. Following his inspection there was a short program of aerial activities by the reserve officers of the Air Service and the commercial pilots of the Field. This was followed by a dinner at the Kansas City Club for the General and his party under the auspices of the Officers of the Air Service Reserves of Kansas City.—T.S.J.

Progressive Alabama

The *Montgomery Advertiser* of Montgomery, Ala., recently printed a proclamation issued by the Hon. William W. Brandon, Governor of Alabama, wherein he reviews briefly the tremendous progress that has been made in the science of aviation, and especially its remarkable commercial and industrial utility. He mentions the fact that the development of aerial traffic imposes certain duties and obligations upon States, counties and municipalities as well as upon the Federal Government.

His proclamation should be of interest to all and the following paragraphs from the proclamation are therefore quoted:

"Now, therefore, I, William W. Brandon, governor of the state of Alabama, in consideration of the premises and by virtue of the authority vested in me by this instrument do appeal to the municipal officials and civic organizations of this state to effect the following:

"1. Locate a terrain in proximity to their town or city which can be used and designed as a municipal landing field for aircraft. Such field should be smooth and dry of surface, reasonably level, unobstructed and in dimensions should not be less than 3000 ft. square; there should be no wires, high trees, fences or other obstacles surrounding the landing place.

"2. Mark such field with a large white circle of durable material 100 ft. in diameter, the band of which should not be less than 4 ft. in width. Paint the name of the city or town on the roof of some prominent building preferably the railroad station, if there is such, in large letters which will be visible to a height of 3000 ft. in clear weather.

"3. Place a cloth cone, flag or instrument to indicate the wind direction at the edge of the field."

It is to be hoped that Governor Brandon's proclamation will bring quick results in building up Alabama's airways. According to the latest information available, there are in Alabama only six permanent airports, namely two government (Montgomery and Anniston), two municipal (Mobile and Troy), and two commercial (Birmingham and Demopolis).

Chicago News

Two U. S. Marine flyers on their way from Quantico, W. Va. to Minneapolis, Minn., were stranded at Black's field Saturday, Oct. 27, when their DeHaviland met with a slight mishap in landing. The plane approached the field from the East and in passing the road at the foot of Black's field, the tail skid caught on the curb, causing the plane to set down so heavily that the undercarriage broke. The officers immediately began repairs, but later decided in view of the wet and soft condition of the field to ask permission to ship the plane by rail. This permission was granted Sunday afternoon.

Fred Hottorp, who recently purchased a J1 Standard and has since been taking instructions at Black's field, "soloed" his ship Oct. 28. The same day two girl members of the "Molly Darling" company, who completed their engagement at the Colonial Theater that week, left for Milwaukee, Wis. by airplane. W. W. Meyer carried them to their destination in the Heath "Favorite".

LaPierre Cavender, whose Canuck was washed out in a wind storm about two months ago, has almost completed the job of rebuilding it. He expects to be flying the ship within two weeks.—O. K.

Official Photographs, U. S. Army Air Service

These are probably the most remarkable airplane photographs ever taken of the sinking of a battleship. The explosion of a bomb dee under picture the old battleship is listing badly to port and the after deck is seen to be burning. In a minute or two she rolls over and a lit geyser then the proud old ship slides almost vertical to its

Aviation and t

By CAPT. L. McN

Director of Naval Intelligence, N

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"Out of three hundred and forty million dollars allowed for maintenance of the Navy, Naval Aviation is allowed less than fifteen millions. On this meagre appropriation we have managed to struggle along and barely keep afloat.

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"Until the advent of aviation, sea power, as shown by our great naval writer, Captain Mahan, had settled practically all wars in the history of the world. Air power has changed all this. In the present and in the future, wars will be settled by control of the air as well as by control of the sea."

It is this five per cent for Naval Aviation that seems to us unbalanced. We also feel that Captain McNamee is wrong when he says that if we had a "huge air fleet" and no Army or Navy we would lose our territorial possessions. His assumption must also grant that the enemy, too, is without such forces or he underrates the intelligence of those charged with the defense of our country. It will, however, be of interest for those concerned about the future of American aviation to read the Navy attitude so forcefully presented.—EDITOR.

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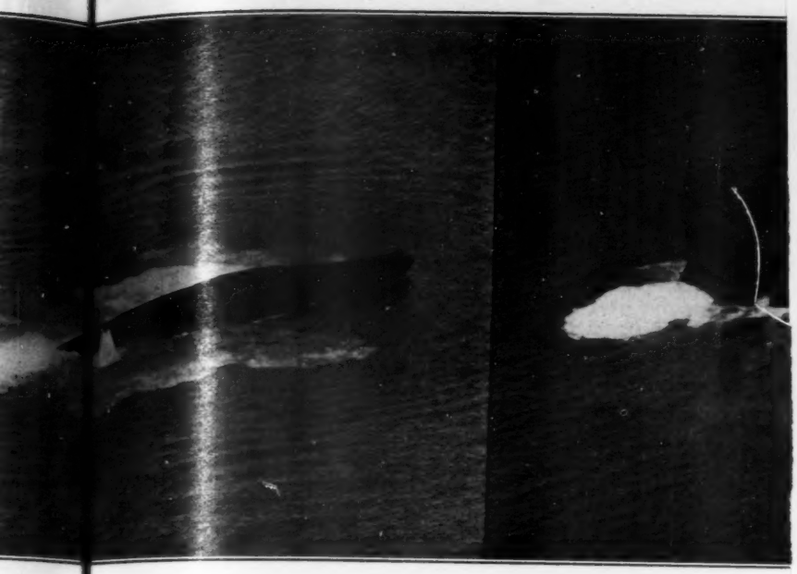

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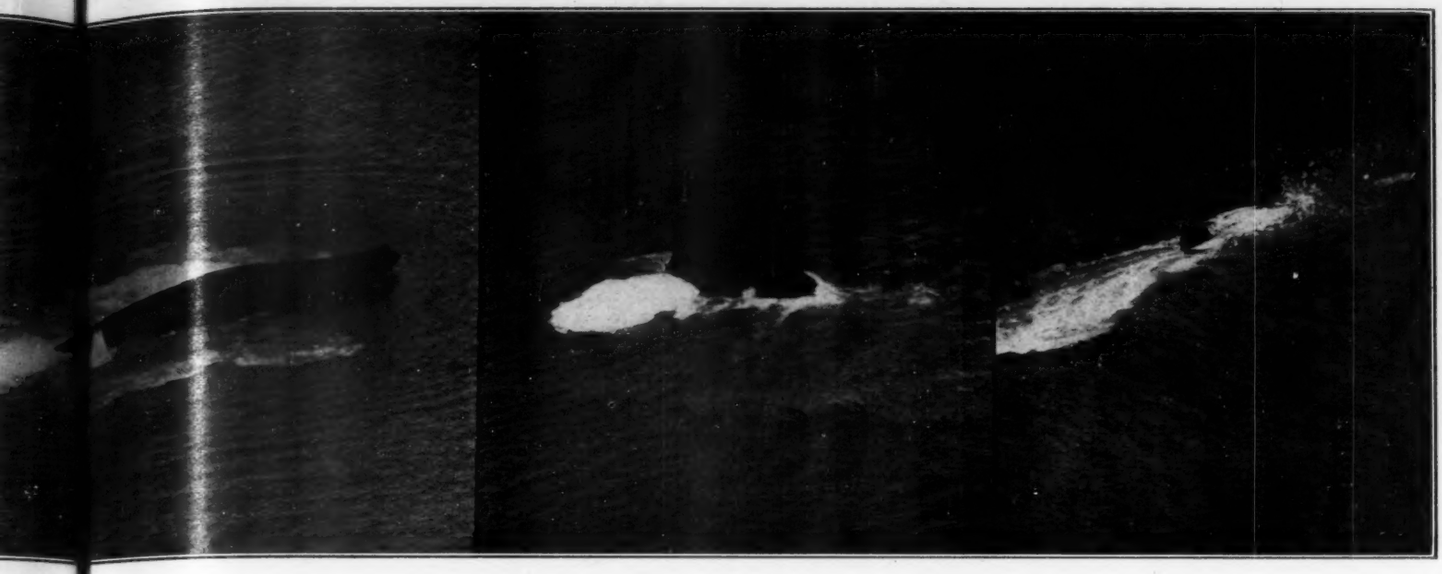

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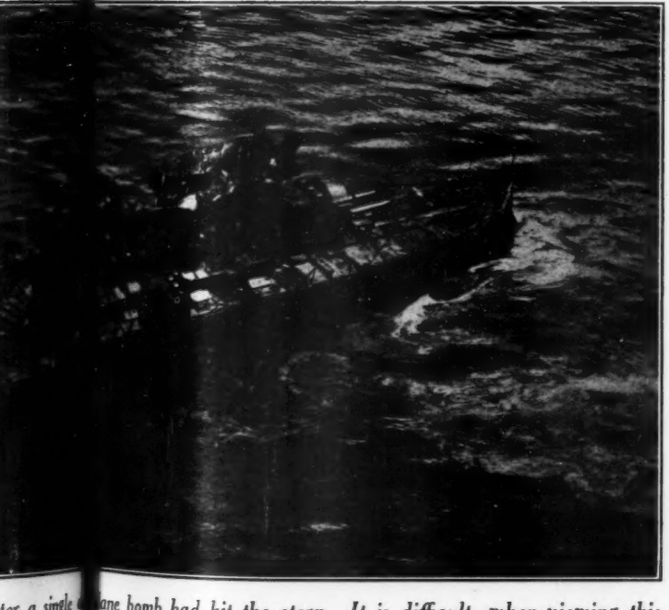

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Starting off with the assumption that aircraft will put all ships out of business, as certain widely advertised individuals maintain, it is only natural that the man in the street should picture naval officers as fighting to hold on to their jobs and opposing every new development in the air.

I have been in the Navy thirty-five years and I have seen the battleship put out of business on paper many times. First there was the ram. Small steamers with huge rams were going to surround the battleship like so many hornets and sting it to death. Then came the torpedo boat, the destroyer and the submarine that were to sink it with a torpedo costing only a few thousand dollars, then the zeppelin and now the airplane bomber, that are to shower destruction upon it from the sky. But the old battleship, like the old flag, is still there. Every new form of attack has developed a corresponding defense and the battleship still stands the backbone of every country's naval defense.

Protection Against Air Attack

Battleship protection against air attack will be of two kinds, defensive and offensive. The defensive consists in adding blisters or explosion chambers to the older ship's sides to protect the ship's vitals from bombs exploding nearby in the water. New battleships have this protection built into the hull. Additional steel decks will be added to old battleships to prevent penetration of the bombs that drop on board. In addition the battleship will be protected by high speed and constant change of course that will throw the bomber off his target, as will the barrage of bursting shrapnel from anti-aircraft guns. Moreover the bomber will have to sustain the fire of dozens of machine guns before he can get within range. These may all be classed as defensive measures.

The fleet's offensive will be from fighting planes launched by catapults from the decks of the battleship itself. These fighting planes will have as their mission to shoot down the slow heavy bomber before he can get near enough to do any damage. That means that if the bomber is to get in his attack he must be protected by an escort of fighting planes. But the air protection of the battleship when near an enemy coast will be supplemented by additional fighting planes other than those the battleship itself can carry. These will be provided by aircraft that accompany the battleships. The fleet's aircraft provided with means for flying off and landing on the carriers and backed up by the fire of the fleet should make a most effective defense against land planes that would be fighting at sea far removed from their bases, and certain of destruction

if forced to alight. Under these conditions no successful bombing attack would be possible.

The Navy far from opposing the development of aircraft is anxious to develop its offensive and defensive powers to the maximum because it is realized that the airplane is one of the most powerful auxiliaries of the fleet. Airplanes, and dirigibles too, in some cases, will make effective scouts, giving early information of the approach of the enemy and of the disposition of his fleet. They will be used for observing and directing the fall of our shots during battle and will attack when possible the enemy's vessels with bombs and torpedoes.

Some Naval Air Activities

We are now building two aircraft carriers of 33,000 tons each. These were originally intended for battle cruisers but under the Limitation of Arms Treaty they can be used only for aircraft carriers. The Navy is developing naval aviation to the limit of the funds that can be obtained from Congress. The public does not realize that the naval air force is regarded as just as much a part of the fleet as the submarine and destroyers. Squadrons of seaplanes formed a part of the fleet that went to Panama this year and took part in all the winter maneuvers of the fleet. Battleships and cruisers are all being equipped with planes and catapults to launch them. The Langley, our first carrier, has solved the problem of flying on and off a ship's deck at speeds up to 60 mi./hr. The Navy has just finished the ZR1, the largest dirigible in the world and one of the greatest successes because it is filled with helium, a non-explosive gas, that makes it safe from explosion or burning. In addition the ZR3 built by Germany for this country is preparing for its flight across the Atlantic under control of the Navy. Navy planes hold the speed record of the world and new devices are constantly under test to develop the utmost in aviation. It would be a bold man that would care to say definitely how far the art of aviation will go, but only a fool would want to scrap what is best now for the sake of something that may be better ten years from now. Amateur strategists, with all the confidence born of ignorance, wish at once to scrap the Navy and the Army too for that matter and leave us nothing but aviation. They are the ones that are hurting aviation, because they are antagonizing the people who are most anxious to develop aviation and give it its proper place. History shows that new forms of warfare may add to but never entirely abolish older forms. No one has ever invented a machine to take the place of a man. The World War was the most scientific war ever known. Chemicals, tanks, dirigibles and bombing planes did their utmost, but the battle was ultimately decided by men, men fighting hand to hand with clubs and fists and knives, because a battle was never decided as long as the enemy held its positions—not till men got into the trenches and killed or captured the defenders and took possession of those positions themselves.

The aviator unassisted, can never *hold* anything. He is essentially a raider. He sails over a town and drops his bombs and sails away. He might do that every day as the Germans did over Paris. Protective measures are found and people get accustomed to it. Sieges have endured for months with great guns pouring in a hell of fire day and night and yet people—men, women and children continue to live and get along in spite of it just as the French did at Rheims.

Aviation is an additional means of making war—it is a powerful auxiliary, but after all only an auxiliary. It must be supported and operate from bases. If its base is at sea on aircraft carriers there must be fleets to guard the carriers. If its base is on the land there must be armies with all the paraphernalia of war to hold these land bases. Aircraft need constant protection for their bases because they can fight only in pleasant weather and during daylight and the enemy may want to fight all the time. We speak of defending the country with aircraft. No country ever won a war by sitting at home on the defensive. That is the Chinese wall idea. The way to win war is to go after the other fellow and hit him where he lives. Let us imagine us at war with any great power. Suppose we have no Navy but are equipped with a huge air force. We would lose Panama, Porto Rico, the Virgin Islands, Hawaii, Guam, Samoa, the Philippines and Alaska. Why? Because the enemy would sink every transport that we sent out with reinforcements for any of those places and no defense that cannot be reenforced can exist indefinitely. It is conceivable that we might protect our own continental shores but we could bring no military pressure to bear against the enemy to compel him to accept peace or give up our possessions.

Economy of Aircraft Use

There has been much misconception in regard to economy in using aircraft instead of battleships. In spite of an expenditure on aircraft of over one billion eight hundred million dollars since 1917 we have not today one-tenth of the aircraft we would need to enter war tomorrow. This is due to the short life of aircraft, the high cost of development and the frequency of crashes and operating casualties. Two-thirds of that cost would build a Navy bigger than our present one—a Navy that would be good for twenty years. So much for the economy argument.

The press has given much notice to the sinking of an obsolete battleship, abandoned, helpless and staked out like a lame bull in a pasture. This experiment is held by some cranks to prove that battleships are useless. The same conclusion would be just as logical if an obsolete airplane were hung up in the sky and shot down by battleships to prove that aviation is valueless. Or if the Army moved its troops out of one of the forts of New York and the Atlantic Fleet would knock the abandoned fort to pieces to prove that coast defenses are useless.

The Navy is going ahead developing its aviation to the limit of its appropriations but it hasn't forgotten that it isn't the man that hits and runs away that wins the fight. We need a Navy that can stand up and take blows and hit back harder than the other fellow—a Navy with battleships *and* planes—and that is the kind of a Navy we propose to have.

Bombing of the New Jersey and Virginia

When the account of the bombing of the battleships New Jersey and Virginia appeared in AVIATION, *it was not possible to secure as many pictures of the event as have been available recently. The Air Service photographic section is short of personnel and could not make copies of their excellent pictures as quickly as a weekly publication needs them.*

Believing that readers of AVIATION *will be interested in more detailed views of the recent aircraft bombing, the pictures on these pages are reproduced at this time. They were taken by the Army Air Service photographic section from land type planes flying out over the ocean, many miles from Cape Hatteras. The pilots and photographers on these planes deserve great praise. Some observers expressed the opinion that their work, flying as they did very close to the exploding bombs, was much more dangerous than the mission of the bombing planes that flew at safe altitudes and out of the range of the exploding bombs.*

At the risk of repetition, AVIATION *is reprinting a talk given over radio by a member of its staff from New York, shortly after the bombing. The fact that this account as well as that of Captain McNamee were both broadcasted by radio may impress many of our readers with the fact that this new medium of expression will have great usefulness in spreading information regarding aeronautics.*

Just picture on this pleasant September evening a sham air attack of an enemy. I don't want to think of an actual war or its possibility any more than you do. But to get the idea of these maneuvers imagine an enemy fleet accompanied by aircraft carriers approaching our coast. They want to land, set up a temporary flying field and from there fly to our railroad centers, navy yards, and coast defense forts and bomb them. Cape Hatteras, located as it is on a strip of sand far out from the mainland, offers the best possible site along the coast for such an attack.

So here we are, off Cape Hatteras. The enemy fleet has, let us say, evaded our Navy, and is about to make a landing. All Army Air Service aircraft east of the Mississippi has been mobilized within twelve hours at Langley Field, Va. In two hours more they have taken off again and flown to Cape Hatteras, 180 mi. down the coast.

By this quick action, we find our air force mobilized at Cape Hatteras on Wednesday morning; an enemy fleet coming our way, and General Mitchell ready with his air force to attack.

I will not go on with the picture—it would bring up the subject of the airplane versus the battleship, and that is too much in controversy at this time to be discussed over radio in a few minutes.

The Scene of Action

Just imagine you are on the deck of the Army transport "St. Mihiel" waiting for the huge Martin bombers to appear. Only a few miles away to the northwest is the little village of Kitty Hawk. It was there on Dec. 17, 1903, just twenty years ago, that Orville Wright made the first motor-controlled flight of 59 sec., and here we are, twenty years later, waiting on a ship at sea for huge landplanes to sink battleships. What will the next twenty years bring us in aviation? Off to the north is the Diamond Shoals Lightship, which is the permanent marker of this stormy region that is known as "the graveyard of the Atlantic." Anchored and rolling peacefully are the two American battleships "New Jersey" and "Virginia" that are to be used as targets for the aircraft bombing. Under the provisions of the Limitation of Armaments Treaty, it was possible to obtain these two obsolete battleships from the Navy Department for this target practice. They were partially dismantled and their water-tight integrity was not of the best. Around the two targets steamed destroyers, mine planters and aircraft tenders. Overhead two Army dirigibles were stationed, sentinels of our air fleets. General Mitchell, with his pennant streaming from the tail of his fast observation plane, darted across the sky directing the attack. Photographic airplanes were making permanent records of the day's work.

It is about nine o'clock in the morning. The first flight of seven Martin bombers, each carrying four 600 lb. bombs, can be seen through the clouds flying at an altitude of 11,000 ft. They had flown over the ocean directly from Langley Field, 180 mi. away. At 11,000 ft. these huge planes, although flying at a speed of over 100 mi./hr., just seem to creep through the heavens. They circle the "New Jersey," testing their bomb sights. Just see that little black speck drop from the leading plane. It seems a whole minute before it reaches the water. It strikes several hundred feet off the bow of the battleship. The fuses of these bombs are so timed that they do not explode the charge until the bomb is deep in the water. Then comes an upheaval of water, smoke, steam and gases. Every ship within several miles feels at the same instant a crash against its hull, as though some giant had struck it with a huge hammer. A deafening explosion, like the discharge of a broadside of big guns on our battleships is heard. Bomb after bomb is dropped in quick succession by the following bombers.

A Direct Hit

The third bomb hit the ship directly on the stern and instead of an upheaval of white and black, there was a burst of flame and rolls of black smoke ascended hundreds of feet in the air. Three other bombs hit the ship on its decks, two exploding simultaneously. Another bomb grazed the side of the ship and exploded directly under the port side. Seventeen or eighteen shots in all were fired, five reaching their mark at places where the damage would occur. These bombs, which contained 350 lb. of explosive were not sufficiently large to do any great damage to the battleship. This test did show, however, for the first time, that our air service pilots can bomb accurately from heights of 10,000 ft. which make them comparatively safe from anti-aircraft fire.

I hope that I have made it very clear that these tests were not an attack such as would occur in battle. It was assumed for the purpose of these tests, that our fast pursuit airplanes had cleared the air of enemy aircraft and that our attack aviation had silenced the anti-aviation guns. The ships were not in motion. They were unmanned, so that any provision for saving them could not be taken. On the other hand, they had no steam in their boilers, no ammunition in their magazines and their machinery was not operating. I want to emphasize the fact that this was neither a test of what a large force of aircraft could do in an attack on a fleet nor of modern battleships being sunk while in action. It was a target practice to test new developments in bomb sights and bombs.

Look up in the air for the next bomb. Another flight of seven Martin bombers is flying over head and we will try to see the black, egg-shaped bomb drop. There she goes! The little black speck grew larger and larger as it fell from 3000 ft. and to the surprise of everyone it hit the water near the "Virgania" instead of the "New Jersey." It was evident, then, that General Mitchell thought the "New Jersey," which was listing badly, and had several holes in her decks, would sink, if left long enough. The second shot was astern, but the third shot was the one that will make bombing history. This bomb, weighing 1100 lb. and containing 700 lb. of explosive, hit the old ship directly behind the aft fighting mast and evidently went right through the protective decks, for flame, smoke and steel flew upward in all directions. It was like the belching of a volcano suddenly rising out of the sea. The whole ship was hidden by smoke and for several minutes everyone waited anxiously to see what had happened. The water was flecked with white splashes made by falling debris for half a mile around the ship. Then the smoke rose thousands of feet in the air and disclosed a wreckage such as has never before been seen after any battle or bombing. The masts were gone, the funnels gone, and the whole superstructure of the ship seemed to be piled up in a tangled mass over the forward turret. All of you will, I hope, see pictures of this wreckage, in the newspapers or at the movies. And remember, when you are looking at them, this one fact—That this is the first time a bomb of battleship calibre has hit a vulnerable part of a ship.

Sinking of the Virginia

Within five minutes after the smoke rose, another bomb dropped to the starboard side of the "Virginia" and sinking deep under the water, exploded directly under her. Great columns of water were thrown up on both sides of the ship, and those of us who had seen the German ships sunk in 1921, knew that the "Virginia" was doomed. She gradually rolled over on her side and turned bottom side up. Geysers of water were forced out of the holes in her hull by the great pressure of air in the overturned ship. There appeared to be a gash 50 ft. long and 20 ft. wide directly along her keel. Gradually the stern went down, and the bow came up, and she sank, stern foremost, to take her place among the wrecks that are so numerous along this stormy coast. It was just 26 min. from the time the first bomb dropped until she sank.

Of course everyone wanted to cheer the great work of the bombers, but while there was no loss of life, it was not a pleasant thing to see one of the proud old battleships that went around the world with Admiral Bob Evans plunge under the waves. Many of us hoped that we would never live to see the day when, by some unlucky maneuver, an enemy bomber might score such a hit on one of our battleships. Our Navy airplane pilots will see to it that this never occurs.

After waiting a while, General Mitchell decided to use the "New Jersey," again as a target. Another bomb dropped alongside and it was just 6½ min. from the time that bomb left the airplane until the "New Jersey," turning on her side and then bottom side up, sank in just the same way as did the "Virginia."

Immediately after the bombing, I asked General Pershing if he would not send a message to the radio audience, knowing how interested you would be to hear from him directly. He consented to do this, and I am going to conclude my talk by reading to you a message from the General of the Armies of the United States which was prepared expressly for you.

General Pershing said: "The aircraft bombing test held on Wednesday, Sept. 5, off Cape Hatteras, when the battleships New Jersey and Virginia were sunk, mark another advance in the science of bombing. We knew from the bombing of the German warships in 1921 that aircraft bombs of maximum weight could sink the older class battleships. This year, in the tests,

we aim to determine the accuracy from ten and six thousand feet respectively; the performance of fuses and the effect of new types of bombs of one and two thousand pounds.

"The results of the tests again illustrate the utility of aircraft in coast defense operations. The fact that the battleships were sunk might lead to the conclusion that that was the sole object of these maneuvers. Previous to the tests on Wednesday, these airplanes had carried out a practice flight to show that our air squadrons from Langley Field could mobilize at any point on the coast from Maine to Florida in seven hours. They made a temporary base on the sand dunes of Cape Hatteras and from this temporary airdrome made their flights to the battleship targets sixteen miles off shore.

"These tests against obsolete ships will not, I hope, be considered as any conclusive evidence that similar bombs would sink modern types of battleships, particularly when manned, defended and able to take protective measures against the effects of damage by bombs. It does clearly show, however, that bombs can do great damage to battleships, and that our Air Service has trained personnel that can bomb accurately.

"Our Air Service is to be congratulated on the splendid showing made at these exercises."

Aviation in China

Aviation is the plaything of militarism in China and commercial development is an impossibility, judging from remarks made to a representative of the *Japan Advertiser* by Capt. C. H. Dolan, former instructor in aviation in the employ of the Chinese government. Captain Dolan served in France during the war as a member of the famous Lafayette Escadrille, and, upon his return to the United States served for a period of about two years in the Information Division of the Army Air Service.

Referring to the aviation question in China, Captain Dolan states that "the extravagant plans of the aeronautical bureau in the Chinese government have practically vanished in thin air, and the immense sums of money spent in airplanes, spare parts and equipment have been wasted.

"Like every other kind of business in China, commercial flying will never be placed on a paying basis until there is a government to guarantee safety of property and encourage foreign capital to invest in Chinese enterprises. A stable government will not be seen in China for generations. For that reason the progress made in aviation through the aid of four foreign instructors can be regarded as wasted."

Two air routes exist in China at present, one from Peking to Tientsin and one from Peking to Peitaiho. They are not very successful, as there is no money to maintain them. The government has exhausted the Vickers loan which kept the aviation school running for a time in addition to buying equipment.

"Commercial flying is impracticable, however, as the pilot runs the chance of having some tuchun confiscate it as 'just what he needs' to protect his own interest," Captain Dolan says. "Neither Chinese nor foreign capital can be attracted, as no guarantees against theft can be made. For the same reason American business men are closing up shop and moving out of China, convinced that the political situation is hopeless and that it will remain in its present state for years."

Requirements of a Man Propelled Airplane

By MATTHEW B. SELLERS

The recent success achieved by the Gerhart "cycleplane" in flying off the ground with a propeller actuated by foot power, makes it of timely interest to consider the requirements and limitations of such a machine.

First, as to power available, it has been found that a man can exert one horsepower for a short time—how long, depends on the man. One horsepower is 33,000 ft. lb. per minute, or 165 lb. raised 200 ft. per minute. A 165 lb. man running up stairs at the rate of 200 ft. per minute exerts one horsepower. As we shall need all the power at our disposal we shall assume one horsepower as our input.

Regarding propeller thrust, the slower the speed required to fly, the greater the thrust available. One horsepower is 375 mi. lb./hr., or for example 18.8 lb. at 20 mi./hr. For a propeller having 80 per cent efficiency this would give 15 lb. thrust.

It is desirable to give a "cycleplane" the largest practicable wing area, both because it permits low speed, thus increasing thrust; and because it allows the use of a low lift coefficient and consequently a high L/D ratio.

The parasite resistance increases as the square of speed, but is small for these low speeds.

Now, as an illustration we shall consider two machines—one being loaded 1 lb. per square foot of wing area, and the other 0.6 lb. It is permissible to build these machines light, and from preliminary estimates it appears that the weight can be kept within 100 lb. including the propelling mechanism. Assuming the operator to weigh 150 lb., we have 250 lb. total weight.

Table I gives the aerodynamic characteristics of a machine loaded 1 lb. per square foot of wing area. The first column shows the lift coefficient L in mile pounds per hour, column 2 the best lift drag ratio for each L, using in each case an appropriate wing section. V is the necessary flying speed, in miles per hour, for each L; D the drag, for the corresponding L/D ratio; R the parasite resistance, in pounds, assuming a projected area of 12 sq. ft. and a ratio of 1:6 for fairing, giving a 2 sq. ft. equivalent normal plane; D+R is the total resistance and T the available thrust, in pounds, for 1 hp. and 80 per cent efficiency.

In this case it will be seen that all resistances are greater than the available thrusts, the nearest being for $L = 0.002$.

In Table II are given the same characteristics as those shown in Table I, but referring to a machine loaded only 0.6 lb. per square foot of wing area.

We see from Table II that at 20 mi./hr. the resistance is 13.6 lb. and thrust 15 lb.—and also that at 17.5 mi./hr. we have one pound leeway.

If we assumed a larger wing area for the same weight, the results would be still better, but the machine would be fragile, and unmanageable.

Taking 0.6 lb. per ft., 250 lb. requires a wing area of 417 sq. ft., which would give a biplane wing about 6 x 36 ft., or a triplane wing about 5 x 30 ft. However, we should have to allow for some loss in efficiency due to biplane or triplane effect.

TABLE I. AERODYNAMIC CHARACTERISTICS OF A CYCLEPLANE LOADED 1 LB./SQ. FT.

L	L/D	V	D	R	$D+R$	T
.0015	22	26	11.4	4.2	15.6	11.5
.002	16	22.5	14	3.3	17.3	13.4
.0025	14	20	18	2.6	20.6	15
.003	12	19	21	2.4	23.4	16

TABLE II. AERODYNAMIC CHARACTERISTICS OF A CYCLEPLANE LOADED 0.6 LB./SQ. FT.

L	L/D	V	D	R	$D+R$	T
.0015	22	20	11.4	2.6	13.6	15
.002	18	17.5	14	2	16	17
.0025	14	15.5	18	1.6	19.6	19.3
.003	12	14.2	21	1.3	22.3	21.1

Careful design would be required to keep down the weight of such a machine, but even so it should be evident that except as an interesting experiment and as a proof that man-powered flight is possible for a few brief instants, a "cycleplane" or "aviette" would have little practical value. At the same time it seemed interesting to make clear the lower limits in power required to carry a man in flight without a mechanical motor, for this subject is a source of constantly recurring "inventions" which entail expenditures of money and efforts out of all proportion to the results it is reasonable to expect. The data given in the accompanying tables should make this fact quite evident.

U. S. ARMY AND NAVY AIR FORCES

U. S. ARMY AIR SERVICE

Army Orders

Sec. Lieut. Joseph Travis Reese, A.S.O.R.C., to active duty A.S. Primary Flying School, Brooks Field, for instruction.

First Lieut. William V. Andrews, A.S., from office, C.A.S., to Advanced Flying School, Kelly Field, for refresher instruction.

First Lieut. John M. Davies, A.S., from present duties, Langley Field, to A.S. Tactical School for instruction.

Maj. Eugene A. Lohman, A.S., Kelly Field, to Aberdeen Proving Ground.

Maj. John H. Pirie, A.S., Aberdeen Proving Ground, to command of bombardment group, Langley Field.

Two months' leave of absence to Capt. Richard H. Ballard, A. S.

Maj. John N. Reynolds, A.S., from present duties, Langley Field, to A.S. Tactical School for instruction.

Capt. Oliver P. Echols, A.S., Office, C.A.S., to Army War College as A.S. liaison officer, vice Maj. Herbert A. Dargue, A.S., relieved.

Orders Sept. 4, First Lieut. Reuben C. Moffat, A.S., amended to read; Lieutenant Moffat, Mass. N. G., Framingham, Mass., to Selfridge Field by Nov. 30.

First Lieut. Paul C. Wilkins, A.S., Bolling Field, to transport sailing New York Dec. 5 for San Francisco; thence to A.S., Hawaiian Dept., Honolulu, transport sailing Jan. 15 from San Francisco.

First Lieut. Claude E. Duncan, A.S. Hawaiian Dept. to Kelly Field.

Orders July 27 Sec. Lieut. Raymond Milton Wilson, A.S. O.R.C., Newton, Ill., amended to show his address as 3039 Vallejo Street, Denver, Col.

Names of A. S. Officers given below have been removed from detached officers' list: Lieut. Col. Benjamin D. Foulois; Majs. Harold Geiger, James E. Chaney, Carlyle H. Wash and Howard C. Davidson.

First Lieut. Earle G. Harper, Office, C.A.S., to transport sailing New York to San Francisco Dec. 5 to temporary duty Ninth Corps Area, San Francisco, by transport sailing New York Dec. 5; thence to A.S., Philippine Dept., Manila by transport sailing San Francisco Feb. 19.

Orders Aug. 13 First Lieut. Edward L. Fernsten, A.S., amended directing Lieutenant Fernsten to sail on transport leaving New York for Panama Nov. 28.

Sec. Lieut Fred James Woods, A.S., Kelly Field, to Coast Artillery Corps, Fort Eustis, Va.

How Long It Takes to Make a Mosaic

A very interesting and instructive experiment was conducted at Kelly Field by Captain Giffer of the Photographic Department in respect to the actual hours required to make a mosaic, complete the prints and have same in the hands of the 2nd Field Artillery Brigade, Camp Travis, Tex. Time was as follows:

Time of take off from Kelly Field to landing	2 men	2 hr.
Time required to develop film	2 men	2 hr.
Time required for printing	3 men	6 hr.
Time required for laying down control	1 man	3 hr.
Time required for laying down mosaic	1 man	11 hr.
Time required for lettering and placing of Tuds	1 man	4 hr.
Time required for copying mosaic (est)	1 man	2 hr.
Time required for printing 20 copies (est)	1 man	2 hr.
Total	12 men	48 hr.

The area photographed was Camp Travis and Bullis covering approximately 90 sq. mi.; the previous map in use by troops in maneuvers was found to be inconvenient in a great many cases, particularly as to location of landmark hills, woods, etc.

88th Squadron Travels

The 88th Observation Squadron, stationed at Wilbur Wright Field, Fairfield, Ohio, made a trip to Norton Field, Columbus, Ohio, recently, and returned several days later. All the pilots traveled by air and the rest of the squadron traveled by motor truck. The purpose of the trip was to place the squadron on record as being able to move on short notice from one flying field to another. The 88th Squadron is a perfectly self-reliant and self-contained unit and carries with it, by truck and by airplane, everything that it needs, including Quartermaster supplies as well as Air Service equipment.

Fire Destroys Hangar

Damage estimated at $15,000 was caused by fire which destroyed an airplane hangar at Bolling Field, D. C., on Oct. 15. No planes were in the hangar when it burned.

U. S. NAVAL AVIATION

Airship Shenandoah Visits Shenandoah Valley

The U.S.S. Shenandoah paid a visit to the valley that bears her name on Oct. 27, Navy Day. The trip from the Naval Air Station at Lakehurst, N. J., to the Shenandoah Valley was made at Twentieth Century Limited time. The schedule announced before the flight, stating that she would be over Winchester, Va., at noon, Richmond at 5 p. m. and Washington at 7 p. m. was followed to the minute. The big airship returned to her hangar at Lakehurst at about 10 p. m. and was put to bed for the night.

The flight over Washington was made with searchlights playing on her from the roof of one of the big down-town hotels and presented a very inspiring sight. Her membership in the great sisterhood of Navy ships was shown by the red and green running lights that gleamed on her port and starboard sides, respectively. During the intervals when the searchlight beams were not cast on the Shenandoah she loomed up through the darkness as a great white phantom, with only the tiny running lights to indicate that she was a man made craft and not a spectral visitor from other worlds.

Navy Day Celebration

Naval Aviation was prominently identified with the celebration of Navy Day, Oct. 27. In addition to the flight of the airship Shenandoah to the valley of that name, naval heavier-than-aircraft "showed the flag" according to the following schedule:

Naval Aviation Reserve Unit, Boston, Mass.—To cover Boston and surrounding towns, distributing literature.

Naval Aviation Reserve Unit, New York—To cover New York, Brooklyn, Jersey City and Poughkeepsie.

Naval Air Station, Anacostia, D. C., and Brown Field, Quantico, Va.—Eight planes to fly as follows: (1) Two planes start Minneapolis and cover St. Paul, Milwaukee and Chicago; (2) Two planes start from Omaha and cover Davenport, Ia., Rantoul, Ill., Indianapolis, Cincinnati and Dayton; (3) Two planes start from Moundsville and cover Louisville, Ky., St. Louis and Kansas City; (4) Two planes start from Anacostia and cover Baltimore, Wilmington, and Philadelphia. Marine Corps and Navy planes to go in pairs on each of these flights.

Hampton Roads, Va., Naval Air Station, U.S.S. Langley—Planes to fly over Richmond and Norfolk.

Naval Aircraft Squadron, Scouting Fleet—Planes to fly over Charleston and make flight to Savannah.

Pensacola, Fla.—Landplanes to cover Columbus, Ga., Macon, Ga., Atlanta, Montgomery, Birmingham and Nashville. Seaplanes to cover New Orleans, Mobile, Apalachicola and intervening coastal towns.

Aircraft Squadrons, Battle Fleet, based on San Diego—Planes to cover Yuma and Tucson, Ariz., El Paso, Tex., Los Angeles and San Francisco, Calif., and towns en route.

Personnel Notes

Lieut. Gail Morgan, U.S.N., has been detached from the Bureau of Aeronautics and was to leave for the west coast on Nov. 1. He has been attached to the Aircraft Squadrons Battle Fleet, based at San Diego, Calif. Lieutenant Morgan has been the operations officer of the Flight Division since the establishment of the Bureau of Aeronautics over two years ago. He will be very much missed by the officers and personnel of the Bureau, and all unite in wishing him the best of luck in his new duty.

Lieut. Comdr. Charles P. Mason, U.S.N., reported to the Plans Division of the Bureau of Aeronautics for temporary additional duty on Oct. 30. Lieut. Commander Mason is attached to the Naval Air Station at Pensacola, Fla.

Lieut. Comdr. L. C. Sheible, U.S.N., has been detailed to the Bureau of Ordnance to take charge of the Aviation Ordnance Section. He is now at the Bureau of Ordnance and will take over his new duties in a few days. Lieut. Commander Sheible was in command of a destroyer on the Asiatic station prior to his assignment to the Bureau of Ordnance.

Cruiser Pittsburgh at Schneider Cup Race

The U.S.S. Pittsburgh, flagship of the U. S. Naval Forces in Europe, was at Cowes, England, during the Schneider Cup Race, and was stationed in the seaplane race course.

After the race our fliers entertained all foreign airmen, the Force Commander, Staff and Officers of the ship at a buffet luncheon and the Royal London Yacht Club gave a dinner to the airmen, to which the Force Commander and an aide were invited. At both of these functions the best of feeling and comradeship was evident. Everyone was full of praise for the performance of our Navy pilots and our seaplanes and their congratulations were most hearty. Both Lieutenants Rittenhouse and Irvine stated that the presence of the Pittsburgh, with all hands on deck cheering them on, had a splendid effect on them and urged them on to greater effort. Also that the Pittsburgh, anchored on the course was an excellent mark for them in flying toward the westward turning point. The ship's boats assisted in patrolling the course and did duty at the starting point.

Reserve Stations Making Good Progress

A record of 11 hr. 16 min. flying time for one day, with only two planes in operation, was made during the week ending Oct. 20 by the Naval Reserve Air Station at Squantum, Mass. Due to high winds and rain, flying for that week was confined to the first three days, but during that time a total of 30 hr. 54 min. flying time was secured. The Squantum reserves seem determined to spend all of their waking hours in the air.

Twenty men have been qualified as pilots from the Naval Reserve Air Station at Fort Hamilton, Brooklyn, N. Y., since June 1. This is an excellent total when the limited facilities at that station are considered.

Submarine Plane Trials Under Way

The submarine S1 is now at the Naval Air Station at Hampton Roads, Va., and trials with the submarine planes are in progress. The trials commenced on Oct. 16, and will be continued for some time, to demonstrate the practicability of aircraft operations from a submarine. The planes to be tested for this work are the XS1 and MS1 type. These planes were designed especially to be carried on board submarines and are the smallest service seaplanes in the world. The XS1 is a product of the Cox-Klemin Co. of Garden City, L. I., and the MS1 planes were built by the Glen L. Martin Co. of Cleveland.

Battle Fleet Planes Land in High Wind

Four planes of Fighting Plane Squadron Two, Aircraft Squadrons Battle Fleet, while proceeding to San Francisco American Legion Convention, on Oct. 15, were forced to land for fuel in a high wind and sand storm at Mojave, Calif. The velocity of the wind was 45 mi./hr. and the air was full of sand. The planes landed successfully. Such was the force of the wind, that in taking off into the wind, one of the planes was in the air within 6 ft. of the point of starting. The planes were of the Vought VE7 landplane type.

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The Publisher's News Letter

In looking over the two English aeronautical weeklies *Flight* and *The Aeroplane* a very significant fact will become apparent to everyone. Practically all the large British aircraft companies are represented in every issue by a full page advertisement giving details of their products. Inquiry shows that these companies are virtually in the same position as our American manufacturers. They have only one customer, the government. The British commercial air services only require a very limited number of ships, so that the air line operators cannot truly be said to be in the market for ships. Take almost any issue and we find the following companies using full pages to create good will:

The Westland Aircraft Works, Armstrong Siddeley, Vickers, Aircraft Disposal Co., A. V. Roe & Co., Gloucestershire Aircraft Co., Palmer Tyres, H. G. Hawker Engineering Co., Bristol Aeroplane Co., Fairey Aviation Co., D. Napier & Son, Rolls-Royce, George Parnall & Co., C. C. Wakefield & Co., Blackburn Aircraft, Short Bros., Sunbeam-Coatalen.

Other manufacturers and the companies selling accessories, gas, oil, clothing, etc. are all represented. In other words, these aircraft companies recognize the advantage of a trade press which makes aeronautical news available to those interested in the more detailed aspects of the profession.

* * * *

In France the same situation exists. Look over *L'Aeronautique* and see the following companies represented by full page announcements:

P. Levasseur, Radiateurs Chasson, Hispano Suiza, Compagnie Franco-Roumaine, Chantiers Aero-Maritimes, Ferbois, Henry Potez, Nieuport-Astra, Morane-Saulnier, Bleriot, Lignes Aeriennes Latecoere, Zenith, SECM Avions Metalliques, Hanriot, Louis Breguet, Salmson, Voisin, Henry Dits, Farman.

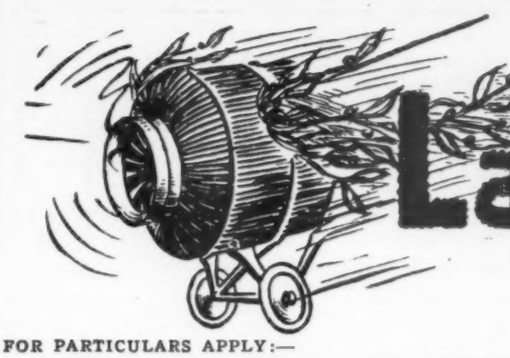
And here, too, the French aeronautic press is filled with smaller advertisements of those seeking business in this field.

* * * *

America is supposed to lead the world in the field of publicity and advertising. With this in mind, compare the American aeronautical press with that abroad. A comparison of editorial pages will not result unfavorably to the American publications. But the advertising pages will tell one of the reasons why American aviation has sunk to its present low business level. That no product can be sold without advertising, is a fundamental principle of modern business. And it will be evident to those who are interested that the companies which have advertised consistently have created a good will that has brought them orders. Of course many large orders have been placed on a price basis with companies that are not doing much in a development way. And what is more to the point, more money has probably been spent by our government with aircraft manufacturers than has been spent in England.

* * * *

The blame for the state of American aeronautical progress has been placed on Congress by the Army and Navy. The manufacturers attribute their present state to the methods of contracting in vogue in the Army and Navy which allows them little margin for promoting the broader side of aviation. Thus the vicious circle is traveled with the aeronautical papers the main sufferers. We have in this country about fifteen companies that are manufacturing aircraft for the government. Most of them are using the aeronautical press to make special announcements without having a constructive publicity policy. If these companies would follow the example of the foreign aircraft manufacturers and let the world know of their products, aeronautics in this country would receive the support from the public that is so necessary at this time.



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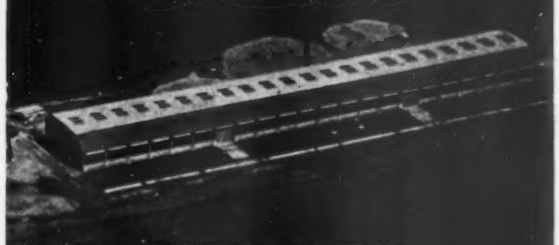

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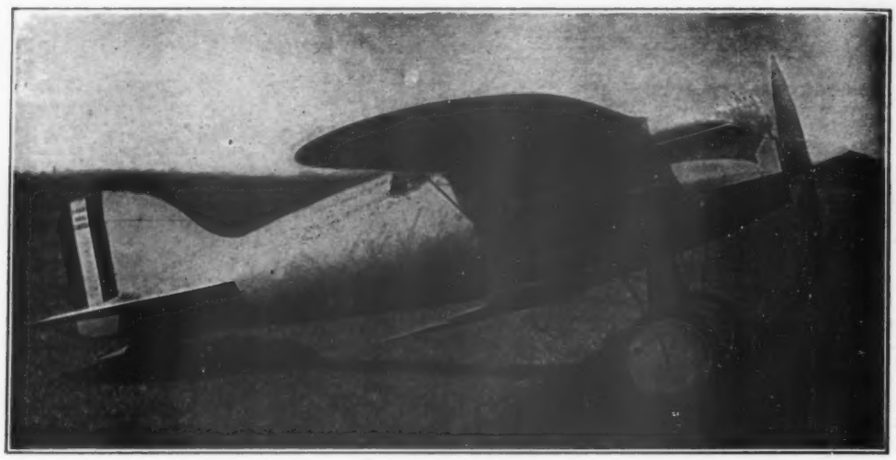

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